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The American Fertilizer

Vol. 97 OCTOBER 10, 1942 No. 8

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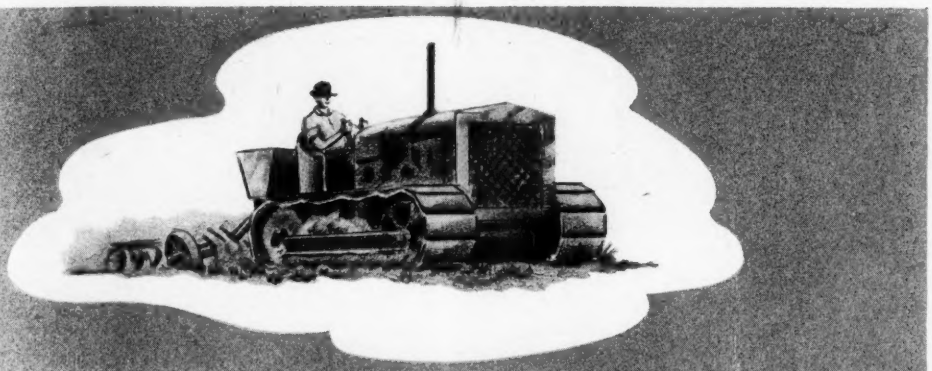

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See page 23

...THE...

AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 97 OCTOBER 10, 1942 No. 8

Chemical Properties of Various Commercial Superphosphates Before and After Ammoniation*

By E. W. HARVEY, The Barrett Division, Allied Chemical & Dye Corp., New York, N. Y.

and

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THE chemical changes which take place in ammoniated superphosphates and which lessen the solubility of the P_2O_5, as determined by the A.O.A.C. method of analysis, are known as "reversion." Some factors which affect "reversion" in superphosphates are well known, such as degree of ammoniation, temperature during storage, and length of storage period. The chemical changes involved in "reversion" are not clearly defined and there are divergent views as to the probable relative importance of the likely reactions. Also there are differences of opinion as to the suitability of the present A.O.A.C. method of analysis for evaluating the availability of ammoniated superphosphates to growing crops.

Reversion in commercial ammoniated superphosphates, according to MacIntire *et al* (*1*)†, is due principally to the formation of $3[Ca_3(PO_4)_2].CaF_2$ while, according to Ross *et al* (*2*), the formation of $3[Ca_3(PO_4)_2].Ca(OH)_2$ may be the important factor. Ammoniation studies have been made by the authors with various commercial superphosphates obtained from different sources to determine whether or not there is an association between the concentration of any constituent and P_2O_5 reversion. A presentation of these data may be helpful in stimulating further study of the factors contributing to reversion and of the adequacy (correlation with effect on growing crop) of different methods of laboratory estimation of the same.

The superphosphates studied were obtained from the following locations: No. 1, Norfolk, Va.; No. 2, Paulsboro, N. J.; No. 3, Baltimore, Md.; No. 4, Buffalo, N. Y.; No. 5, Harvey, La.; No. 6, Wilmington, N. C.; No. 7, Memphis, Tenn.; No. 8, Carteret, N. J.

Procedure

Ammoniation of Mixtures: The superphosphates as received at the laboratory varied appreciably in particle size, particularly in the 14–20 mesh range. All materials were therefore milled to pass 100 per cent through 20 mesh before ammoniation. The superphosphates were ammoniated in small (2 kg.) batches with Nitrogen Solution 2‡ employing an ammoniation ratio of 30 lb. free NH_3 or 150 lb. Nitrogen Solution 2 per 1,000 lb. superphosphate.

Sampling and Storage: Following ammoniation, each mixture was divided into several uniform, representative samples. These samples, contained in stoppered bottles, were stored at 25°, 40°, 50° and 80° C. for periods up to 124 days and analyzed at intervals for progressive P_2O_5 reversion.

Methods of Analysis: The results of the various analyses made on the superphosphates are shown in Tables I and II. The analytical procedures employed in determining some of the constituents are briefly as follows:

P_2O_5: A.O.A.C. (*3*) methods for total and citrate-insoluble P_2O_5. Some samples were also analyzed for citrate-insoluble P_2O_5 em-

*Paper presented before the American Chemical Society Meeting, Division of Fertilizer Chemistry, at Buffalo, New York, September 7, 1942.

†Numbers in parentheses refer to literature listed at end of article.

‡Composition of Nitrogen Solution 2: ammonium nitrate, 60 per cent; ammonia, 20 per cent; water, 20 per cent.

ploying a modification of the A.O.A.C. procedure in which a 0.5 g., instead of 1 g., sample was used for analysis. Reversion was expressed as per cent of total P_2O_5 reverted and was calculated as the difference between the per cent of the total P_2O_5 which was citrate-insoluble in the ammoniated product and in the original superphosphate.

Moisture: A. O. A. C. method (*3*) for fertilizers, based on weight loss on heating 5 hr. at 100° C.

Fluorine: Willard-Winter method, modified for fertilizer materials.

Fe and Al: Fe and Al were co-precipitated and weighed as combined $FePO_4$ and $AlPO_4$. Fe content of combined phosphates was then determined and the Al calculated by difference.

Compositions of Superphosphates

There were significant differences in compositions of the various superphosphates, as shown in Tables I and II.

TABLE I—RANGE OF COMPONENTS OF SUPERPHOSPHATES

COMPONENT	WT. PER CENT
Moisture	4.5 – 8.3
Fluorine, as F	1.57– 2.15
Iron, as $FePO_4$	0.80– 2.10
Aluminum, as $AlPO_4$	1.43– 4.33
Free acid, as H_3PO_4	1.0 – 3.9
Available P_2O_5	18.0 –21.4

The weight ratio of F to total P_2O_5 ranged from 0.079 to 0.10 with an average ratio of 0.09. Since the ratio of F to P_2O_5 in the more common types of rock phosphate used in the U. S. is of the order of 0.11, these superphosphates apparently retained more than 70 per cent of the F of the rock phosphate.

Superphosphates 1 and 5 (Table II) contained respectively 0.87 per cent and 0.53 per cent ammoniacal nitrogen as received at the laboratory. The source of this nitrogen is not known but its presence is indicated not to have increased P_2O_5 reversion in the amoniated products.

Reversion of P_2O_5 in Ammoniated Superphosphates

The immediate and progressive P_2O_5 reversion data are given in Tables II and III. A brief discussion of these results in their relation to the composition of the original superphosphates is given below.

It will be noted that there are significant differences in the amount of reversion in the various superphosphates for a given storage condition, *i. e.*, length of time and temperature. Reversion in an individual superphosphate differed from the average reversion of the group by as much as 65 per cent of the value.

These differences in reversion behavior of the various superphosphates under the more severe storage conditions are much greater than the probable experimental error.

Reversion by the 0.5 and 1 g. Methods for Citrate-Insoluble P_2O_5: A comparison of reversion data obtained by these methods is of interest because:

(1) The results of the 0.5 g. procedure are indicative of the reversion that would be found by the 1 g. (official method) if the ammoniated superphosphates were diluted to half the initial P_2O_5 concentration, as in preparation of fertilizer mixtures containing

(Continued on page 24)

TABLE II—CHEMICAL PROPERTIES OF VARIOUS COMMERCIAL SUPERPHOSPHATES BEFORE AND AFTER AMMONIATION

Plant Location	Norfolk, Va.	Paulsboro, N. J.	Baltimore, Md.	Buffalo, N. Y.	Harvey, La.	Wilmington, N. C.	Memphis, Tenn.	Carteret, N. J.
Superphosphate No.	1	2	3	4	5	6	7	8
Analysis of Original Superphosphate								
% Moisture	4.5	7.7	5.9	7.6	8.3	4.5	6.5	7.2
% Free H_3PO_4	1.2	3.5	3.9	3.0	1.0	2.6	2.8	2.9
% Total P_2O_5	19.8	18.2	20.6	21.1	19.1	21.5	19.8	21.2
% C. I. P_2O_5	0.39	0.20	0.28	0.45	0.48	0.13	0.48	0.41
% Available P_2O_5	19.4	18.0	20.3	20.6	18.6	21.4	19.3	20.8
% of Total P_2O_5 available	98.0	98.9	98.6	97.9	97.5	99.4	97.6	98.1
% Fluorine	1.57	1.68	1.92	1.80	1.70	2.15	1.67	2.07
% $FePO_4$	1.10	1.14	1.16	1.81	0.80	0.91	2.10	1.06
% $AlPO_4$	2.77	1.55	1.99	2.36	1.98	1.43	4.33	1.57
% CaO	28.30	30.50	30.35	30.10	29.28	31.13	28.25	30.45
% SO_3	27.75	30.55	28.78	28.48	29.20	29.18	30.55	29.35
Mol ratio SO_3:CaO	0.685	0.701	0.664	0.665	0.698	0.655	0.759	0.674
Analysis of Superphosphate Ammoniated with Nitrogen Solution 2 at Ratio of 30lb. Free NH_3/1000lb. Superphosphate as Prepared								
% Total N	5.60 (a)	4.56	4.59	4.57	5.26 (a)	4.58	4.70	4.59
Wt. ratio free NH_3: Total P_2O_5								
Nominal	0.152	0.165	0.146	0.142	0.158	0.139	0.152	0.141
Found	0.216 (a)	0.159	0.139	0.132	0.183 (a)	0.128	0.148	0.137
% Total P_2O_5	17.3	16.4	18.5	18.5	17.1	19.2	17.1	19.2
% C. I. P_2O_5	0.36	0.27	0.40	0.79	0.32	0.24	0.51	0.61
% of total P_2O_5 reverted	0.1	0.6	0.8	2.2	–0.6	0.7	0.6	1.7

(a) Original superphosphate contained some ammoniacal nitrogen.

Industry Advisory Committee Meets

A meeting of the Fertilizer Industry Advisory Committee was held in Washington on September 23rd. The sub-committee appointed to make recommendations on the problems of fertilizer distribution, presented their report (printed in full elsewhere in the issue) which report was approved in its entirety. It was suggested that comment on the report—whether of approval, objection or suggestion for changes—should be made by members of the industry or other interested persons. Letters should be addressed to T. E. Milliman, Chemicals Branch, War Production Board, Washington, D. C.

In connection with WPB M-231, it was estimated that the list of approved grades will save about 20 per cent of fertilizer nitrogen. The utilization of surplus vegetable meals was discussed, particularly with reference to the increased cost involved in their use. It now seems that about 500,000 tons of such meals will be available for fertilizer use, in addition to the tonnage normally used for the purpose. Among plans suggested for furthering their use were (1) subsidizing their use; (2) lifting the fertilizer price ceilings; (3) permitting additional specific changes where definite additional quantities of such meals are used in a mixture.

The Committee decided to hold regular meetings on the fourth Monday of each month, also to hold group meetings of the industry throughout the country for discussion of the entire situation and to obtain observance of Order M-231.

Certification Needed for Copies of Order M-231

T. E. Milliman, chief of the Agricultural Chemicals Unit, WPB, has announced that copies of Fertilizer Conservation Order M-231 for distribution to dealers and agents may be obtained by fertilizer manufacturers by writing to the War Production Board. However, when requesting more than 25 copies, the manufacturer is required to submit to WPB a list of the dealers and agents to whom the copies are to be distributed, together with an affidavit that all copies will be delivered free of charge. The certification may be in the following form:

"The undersigned hereby certifies that the above list includes only dealers and agents supplied by the undersigned, and that no charge will be made by the undersigned for any copy of Order M-231 supplied by the War Production Board, and that the undersigned in transmitting copies of such Order to said dealers and agents will inform them that no charge is to be made by them for any copy of such Order."

Date of Florida Fertilizer Tax Hearing Advanced

The suit of the U. S. Department of Justice to restrain the State of Florida from seeking to force the Agricultural Adjustment Administration to pay an inspection fee of 25 cents a ton on all fertilizer shipped into the State under its farm benefit payment program will be heard by a three-judge panel at Tallahassee October 26.

Hearings before a three-judge court are necessary because of the constitutional questions involved in the case, it was explained. The government contends that exaction of the fee amounts to a tax on an agency of the Federal Government for which the state has no right under the constitution.

On September 19 the government obtained a temporary restraining order against agents of Florida seizing the fertilizer shipments which was to expire September 29. The temporary order was extended until October 26 to give time to organize of the three-judge court to hear the case.

Fertilizing Legumes Gives Full Fertilizer Values

"More Effective Use of Fertilizers," New Jersey Circular 420, written by Dr. Firman E. Bear, is quite applicable to the present nitrogen shortage. Dr. Bear says, "More lime, phosphate, and potash are required to grow a legume than to grow grass, but when one plows under the legume, or the manure produced from feeding it, he is putting more lime and fertilizer back into the soil than he would be by plowing under grass, or manure that is made from feeding grass. In fact, the growing of legumes for soil-improvement purposes makes it possible to get double use of an application of phosphate and potash fertilizer, first to grow the legume itself, and next to grow the crop that feeds on the legume when it is plowed under."

Industry Committee Makes Recommendations For Fertilizer Distribution

During the latter part of August a committee of fertilizer manufacturers was appointed by the War Production Board to work out detailed recommendations for the distribution of fertilizers during the coming season. On September 22nd this committee completed their work and presented their report to Mr. Milliman. The committee suggested that the nitrogen situation be helped by increasing imports of Chilean nitrate of soda and by making more vegetable meals available for use in fertilizer mixtures. They also recommended a campaign of education among fertilizer dealers and agents so they would have complete knowledge of the details of the fertilizer program and would be able to take care of their present customers in the amounts as specified by the program. Other recommendations included the employment by the War Production Board of experienced fertilizer men at sixteen strategic fertilizer points to serve as liaison men between farmers, County War Boards and fertilizer manufacturers; the appointment of the County War Boards to act as Boards of Appeal on matters of dispute; the granting of additional gasoline rations to fertilizer representatives.

The complete report of the committee is as follows:

Washington, D. C., September 22, 1942

Mr. T. E. Milliman,

Government Presiding Officer, Fertilizer Industry Advisory Committee, Chemicals Branch, War Production Board, Washington, D. C.

DEAR SIR:

The committee appointed on August 24th and confirmed by your letter of August 25th to work out detailed recommendations for distributing approved fertilizer grades by areas and/or crops in the United States, herewith presents this as their report and their recommendations for action by the appropriate government agencies. The report and recommendations are coextensive with the official grade list and consequently refer only to the territory east of the Rockies.

1. The possibility of an insufficient supply of chemical nitrogen for mixed fertilizers, as well as for separate application, to meet all demands in the July 1, 1942 to June 30, 1943 season makes necessary a program and plan for the equitable distribution of the available supply to all buyers in a manner that will be fair to each and every user of fertilizer engaged in the production of agricultural commodities necessary to the war effort.

Increase Supply of Nitrogen

2. In dealing with this subject any plan to be put into effect in the near future appears to us to be necessarily predicated on the estimated available supplies of inorganic nitrogen, plus the estimated supplies of the forms of organic nitrogen which customarily go into fertilizer. As the nitrogen shortage is the crucial factor in the whole fertilizer situation, the committee feels they should not omit this opportunity to urge that appropriate governmental agencies take every possible step to increase the importation of Nitrate of Soda. It is the opinion of the committee that if adequate importation of Nitrate of Soda can be maintained and if the oil meals which it is believed will be available over and above the quantity which can find its way into consumption as feeds were to be made available for fertilizers, then the possibility of a shortage of nitrogen would be greatly minimized or eliminated. From every standpoint, the logical channel for use of such surplus meals is through fertilizers. Failure so to utilize them would constitute, in the opinion of the committee, an irreparable economic loss, both because the meals themselves would be idle resources and because for lack of them the production of food and fiber needed for successful prosecution of the war would be curtailed. For them to serve their purpose in this phase of the war economy, however, it will be necessary for them to be made available to fertilizer manufacturers early in the season so that they may be included in the manufacturing formulas. Too late will be as harmful as too little.

3. In order that there may be a fair distribution of fertilizers to all buyers, there

must be a wholehearted acceptance on the part of the fertilizer industry of the fact that the consumer of fertilizer is of first importance and that his interests transcend those of all others. Only through cooperation between the manufacturer, the agent, dealer or distributor and the farmer can the essential purposes of the program be fully achieved.

4. Any operations intervening between the manufacturer and the farmer must be consistent with this viewpoint in order that proper distribution my be accomplished, and responsibility for his part in the distribution must be laid squarely upon every participant all along the line. In instances where distribution is made through dealers or agents, the dealer or agent, to assure integration of the program and as a social service to the country at large in the present emergency, must function merely as an instrumentality acting for or on behalf of the manufacturer and the farmer, and must conform to such requirements and regulations, including the keeping of records, as may be recommended or required by the War Production Board. Fertilizer manufacturers must assume their full share of responsibility for educating dealers and agents as to the vital part that proper and equitable distribution of fertilizers pursuant to the official program will have in promoting morale and attaining war aims, and must undertake to transmit to such local distributors whatever applicable instructions, recommendations or requests may be issued by WPB.

Distribution on Historical Basis

5. We understand that our instructions contemplate, in general, distribution of mixed fertilizers on an historical basis, and our deliberations have proceeded along that line. Fertilizer sales should be based upon past history of individual customers without any effort to tie grades of fertilizer to individual crops except in so far as the farmer's history may have this result. In cases where there is no past history on which to proceed, the fertilizer manufacturer must accept the responsibility of supplying fertilizers to customers in a fair manner upon the basis of recommendations of State agronomists as to grades and rates of application.

6. Manufacturers must be willing to take care of all of their 1941–42 customers, irrespective of whether some individual types of business or some individual territories are profitable or unprofitable. For instance, they must make fertilizer available in territories where they have heretofore made it available, even though freight rates into a certain territory may be more costly than rates into some other territory in which the manufacturer might be able to distribute fertilizer at a greater profit. The necessities of the present situation, and particularly the suggested distribution of fertilizers on an historical basis, make it desirable that individual members of the fertilizer industry plan and proceed to supply fertilizer to their former customers before offering it to prospective new customers. Fertilizer manufacturers should not attempt to go into new areas unless and until the requirements of persons to whom they have supplied fertilizer in the past have been taken care of. Likewise, as a necessary adjunct of the proposed plan of distribution, and as a matter of equity and fairness, the manufacturer shall not slight areas using high-nitrogen fertilizers in order to increase tonnage of lower-nitrogen fertilizers in other areas.

Caring For New Customers

7. Closely allied is the responsibility, which the manufacturer must assume, for furnishing fertilizer to the farmer who, because he has moved from one community to another, or because his former supplier has died or is out of business, or for some other reason, has no "fertilizer home." Such a farmer would have little difficulty, under normal conditions, in finding a new source of supply, and it must not be permitted that general recourse to the historical basis of distribution under present emergency conditions should leave him stranded. To accomplish this purpose it may be advisable in some instances, as where a farm has changed hands, to relate the history to the farm rather than to the farmer or to work out an equitable result by considering both factors.

8. (a) Lists of the officially designated grades for each individual State, to serve as a guide for the sale of fertilizer on an historical basis, are attached to this report. (This list was published in the September 12th issue of THE AMERICAN FERTILIZER.) It will be noted that in most instances the 1942–1943 grades show a reduction or an omission of the nitrogen content of the parallel 1941–1942 grades. This substitution of lower-nitrogen or no-nitrogen grades will reduce the total fertilizer nitrogen consumption, as dictated by the necessities of the situation, without necessitating a corresponding reduction of superphosphate and potash. In formulating his grades, the manufacturer will be governed, as to these two essential plant foods, by his

(Continued on page 18)

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Vol. 97 OCTOBER 10, 1942 No. 8

Principal Articles in This Issue

PAGE

CHEMICAL PROPERTIES OF VARIOUS COMMERCIAL SUPERPHOSPHATES BEFORE AND AFTER AMMONIATION..... 5

INDUSTRY COMMITTEE MAKES RECOMMENDATIONS FOR FERTILIZER DISTRIBUTION..... 8

Shortage of Nitrogen Fertilizers..... 10

September Tag Sales..... 12

FERTILIZER MATERIALS MARKET

New York..... 13

Baltimore..... 13

Chicago..... 15

Charleston..... 15

Tennessee Phosphate..... 15

Program for Purchase and Distribution of Winter Cover Crop Seed..... 26

Shortage of Nitrogen Fertilizers

By E. B. Reynolds, Agronomist

Texas Agricultural Experiment Station, College Station, Texas

Due to war conditions there will be a shortage of chemical nitrogenous fertilizers in the United States in 1943 because these materials are being used in tremendous quantities in the making of explosives for war purposes. The War Production Board recently estimated that the supply of nitrogenous fertilizer probably would be 80 per cent of normal. According to fertilizer manufacturers there should be ample quantities of superphosphate and potash. In view of the importance of fertilizers in agriculture, especially in the production of food and feed, every effort will be made to have these materials available to farmers. It is anticipated that these will be available in ample quantities unless our transportation facilities and labor become too heavily burdened with war needs.

This shortage of chemical nitrogen, as sulphate of ammonia, cyanamide, nitrate of soda, and urea, fortunately may be overcome partially by the use of winter leguminous cover crops plowed into the soil for soil improvement and the saving and use of nitrogenuous materials, as farm manures of all kinds that can be applied to the soil to increase crop production. In experiments in eastern Texas the plowing under of vetches, peas, and adapted winter clovers, together with the use of adequate amounts of superphosphate and potash, have produced as large yields of cotton and corn as complete commercial fertilizers. This means that the plowing under of legumes for soil improvement can replace the nitrogen in commercial fertilizers for some crops, as cotton, corn, and sorghum.

Experiments over a period of 5 years at the experiment stations at College Station and Tyler have shown that vetch when plowed under furnishes an abundance of nitrogen for cotton. For instance, at College Station during the five years 1937–1941, vetch reinforced with superphosphate and potash equivalent to 500 pounds per acre of 0–8–4 produced an average yield of 301 pounds of lint per acre as compared with 296 pounds from a 4–8–4 applied at the rate of 500 pounds per acre. Unfertilized soil made an average yield of 199 pounds of lint per acre during the same period. Tests made during the active growing season of cotton showed that the soil where the vetch was plowed under contained twice as much nitrogen as the soil fertilized

with 4–8–4 fertilizer or the unfertilized soil. This shows conclusively that plowing under a good crop of vetch supplies as much nitrogen as the cotton can use.

At the experiment station at Tyler vetch was plowed under in the spring and followed by cotton the first year and corn the second year. The soil treated with vetch and superphosphate and potash equivalent to 400 pounds of 0–8–4 per acre produced an average yield of 287 pounds of lint per acre and the soil treated with a 4–8–4 fertilizer at 400 pounds per acre produced 244 pounds of lint per acre during the last five years. The unfertilized soil made an average yield of 190 pounds of lint per acre during this period. Corn which followed cotton on the vetch land the second year produced 26.4 bushels of corn per acre in 1941, as compared with 11.5 bushels for the unfertilized soil. The residual effects of plowing under vetch and other legumes may last three or four years as shown by the results at Tyler and by results obtained in other cotton-belt states. These results show clearly that the plowing under of vetch and other adapted winter growing legumes is a profitable practice, which should be much more widely practiced than it is today.

Farm manure also may be used to relieve the nitrogen shortage. Manure is variable in composition, but on the average it contains about 10 pounds of nitrogen, 5 pounds of phosphoric acid, and 10 to 12 pounds of potash per ton. It, therefore, supplies the three common elements of commercial fertilizers—nitrogen, phosphoric acid, and potash. Manure can effectively replace commercial nitrogen to the extent that it is available. The value of manure depends upon the increases in yield it will produce, which vary greatly with soil and moisture conditions. In experiments with cotton, manure had an average value of $2.00 per ton at Nacogdoches, and $1.00 per ton at College Station.

Since the amount of nitrogen has been reduced in most fertilizers, it may be necessary for the growers to use cottonseed meal, peanut meal, or other highly nitrogenous vegetable meals to make up the deficiency of nitrogen. For instance, the 6–12–6 fertilizer has been reduced to 3–12–6. The farmer, however, may buy the 3–12–6 and mix it at the rate of 200 pounds with 150 to 200 pounds of cottonseed meal, which would roughly be equivalent to 200 pounds of 6–12–6.

Although the shortage of fertilizer nitrogen may be more or less severe, the farmer has adequate means of relieving the shortage if he will only take advantage of them now.

N. F. A. To Meet November 16

The Annual Southern Convention of the National Fertilizer Association will be held at the Biltmore Hotel, Atlanta on November 16th, 17th and 18th. The meeting had been planned originally for the previous week, but the later date was selected to avoid conflict with the annual meeting of the American Society of Agronomy which will be held in St. Louis, November 9th to 12th.

Parker Accepts U. S. D. A. Appointment

Dr. F. W. Parker, Agronomist, E. I. du-Pont de Nemours and Company, has accepted an appointment as Chief of the Division of Fertilizer Research, Bureau of Plant Industry, U. S. Department of Agriculture. This appointment, which took effect on October 1st, is for the duration of the war. Dr. Parker succeeds Prof. R. M. Salter who has been made chief of the Bureau.

"Life of the Soil" New N. F. A. Film Has Premiere Showing

Nearly 100 persons, including distinguished scientists, crop and soils workers, economists, and trade association executives, attended the premiere showing of "The Life of the Soil" at the Mayflower Hotel on September 23. Most of those who attended the meeting of the Fertilizer Industry Advisory Committee and the Nitrogen Conference were present, as these meetings were held in Washington on the same day. Many favorable comments were expressed. H. R. Smalley, Chief Agronomist and Head of the Soil Improvement Work of the National Fertilizer Association, is entitled to the highest praise for seeing this film through from start to finish.

B. O. Graves Recovers from Illness

The many friends of B. O. Graves, president of Hollingshurst and Company, New York City, dealers in fertilizer and feeding materials will be glad to learn that he is back at his desk after an absence of fourteen weeks caused by a heart attack. During his illness he received many tokens of the esteem in which he is held throughout the industry and desires to thank his friends for their kindly expressed wishes.

September Tag Sales

Fertilizer tax tag sales in September in the 17 reporting States were 13 per cent larger than in September, 1941, but were somewhat smaller than in September, 1940.

The increase for the month was due to larger sales in the South, where a 26 per cent gain over last year took place, 9 of the 12 States reporting increases. Sales in the midwestern region were moderately below a year ago, with increases in Indiana and Kentucky not sufficient to offset a sizeable drop in Missouri. August sales in the Midwest had been at an unusually high level and total tonnage in the two months combined, which account for most of the fall business, were well above last year.

Total tag sales in the first 9 months of this year amounted to 5,368,000 tons, compared with 5,280,000 tons in the corresponding period of 1941 and 4,999,000 tons in January-September 1940. Seven of the 17 States have reported increases over last year, with the largest tonnage rise in North Carolina.

California Fertilizer Association to Meet

The annual convention of the California Fertilizer Association will be held at the Biltmore Hotel, Los Angeles, on November 5th, 6th and 7th. The committee has arranged to have government officials present to lead the discussion of the problems facing the industry. An adequate program of entertainment has been arranged, which will include golf, bowling, a party for the ladies, ending with the California-Southern California football game.

FERTILIZER TAX TAG SALES

State	September				January-September			
	Per Cent of '41	1942 Tons	1941 Tons	1940 Tons	Per Cent of '41	1942 Tons	1941 Tons	1940 Tons
Virginia	77	34,021	44,116	38,566	103	374,239	362,194	352,387
N. Carolina	154	29,677	19,222	20,620	106	1,076,264	1,014,873	996,445
S. Carolina	216	10,900	5,040	4,910	92	622,194	677,587	643,484
Georgia	281	15,518	5,513	3,456	99	747,468	751,634	718,119
Florida	128	41,880	32,665	47,703	105	453,138	433,516	382,364
Alabama	219	3,950	1,800	4,250	99	559,700	565,000	566,300
Mississippi	296	4,962	1,675	1,000	90	292,029	323,617	294,295
Tennessee	702	9,563	1,363	6,018	124	159,743	128,338	129,891
Arkansas		3,850	350	200	118	133,158	113,100	93,950
Louisiana	65	7,550	11,600	8,900	89	142,986	160,510	142,431
Texas	65	7,176	11,095	6,258	91	117,294	129,226	109,839
Oklahoma	123	986	800	755	83	8,747	10,600	6,608
Total South	126	170,033	135,239	142,636	100	4,686,960	4,670,195	4,436,113
Indiana	104	34,171	32,939	45,406	116	385,104	332,537	299,350
Illinois	90	6,418	7,162	7,100	131	78,196	59,608	47,760
Kentucky	103	9,525	9,235	10,695	119	136,352	114,112	114,884
Missouri	49	7,675	15,539	29,019	81	69,924	86,039	84,599
Kansas	92	3,605	3,925	7,988	64	11,365	17,786	16,671
Total Midwest	89	61,394	68,800	100,208	112	680,941	610,082	563,264
Grand Total	113	231,427	204,039	242,844	102	5,367,901	5,280,277	4,999,377

BRADLEY & BAKER

FERTILIZER MATERIALS - FEEDSTUFFS

AGENTS - IMPORTERS - BROKERS

155 E. 44th Street
NEW YORK

BRANCHES

Clinton St. & Danville Ave. Baltimore, Md. | **505 Royster Building Norfolk, Va.** | **1252 West Beaver Street Jacksonville, Fla.**

504 Merchants Exchange Bldg., St. Louis, Mo.

FERTILIZER MATERIALS MARKET

NEW YORK

Possible Increase in Production of Inorganic Ammonia But No Immediate Results Expected. Probable Exports of Concentrated Superphosphate Will Increase Domestic Use of Ordinary Superphosphate

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, October 6, 1942.

Sulphate of Ammonia

There has been some indication that the number of government plants for the manufacture of ammonia liquors and sulphate of ammonia will be extended so that there will be an increased production of inorganic ammonia, some of which might find its way into the fertilizer industry, but even if the plan under consideration went into effect, it would not aid the fertilizer manufacturer during this fertilizer year and probably not for the 1943–44 season.

Fertilizer manufacturers are still considering the use of oil meals, but, as mentioned before, the price of these materials against the cost of inorganic ammonia does not make the use of oil meals very inviting.

Nitrate of Soda

Price through October continues at the same level as the price for this material for the previous month and deliveries are still being made against allocation only.

Potash

This situation remains the same. A questionnaire has been issued by the W. P. B. to all potash manufacturers and it is possible that officials may use the information obtained in allocating material for export.

Superphosphate

There has been no change in this market but it is probable that large quantities of triple superphosphate will be withdrawn from the domestic market for export to England.

It is likely that deliveries for the balance of this current year will continue in fair volume but after the turn of the year, there will be a large curtailment on deliveries of triple superphosphate.

This will undoubtedly mean a larger demand for ordinary superphosphate which will probably tax the existing plants to full capacity and might even cause a shortage in this market.

BALTIMORE

Most Organic Nitrogen Too Expensive for Fertilizer Use. Chemical Material Producers Sold Up. Bag Prospects More Favorable

BALTIMORE, October 6, 1942.

Business in the market on fertilizer materials has been practically at a standstill during the past two weeks.

Organic Ammoniates.—The demand for feeding purposes continues good at prevailing ceiling price of $6.00 per unit of nitrogen, f. o. b. shipping point, which makes it impossible to use this class of material as a fertilizer material. The market on vegetable meals is also comparatively high, based on the prevailing market on complete fertilizer, and for this reason buyers are going slowly in their purchases.

Nitrogenous Material.—There are no offerings on the market. Fertilizer manufacturers are hopeful that the Government will release either mineral or liquid ammonia for the spring season's business to encourage the growing of larger crops, but this, of course, is indefinite.

Sulphate of Ammonia.—This material continues to be rationed out and all manufacturers are taking such allocations as are tendered to them. In view of present conditions, there are no resale lots offering on the market.

Nitrate of Soda.—Producers and importers have extended current prices to apply for the month of October, and this commodity is, likewise, being rationed on a basis of last year's deliveries.

Fish Scrap.—There are only a limited number of vessels fishing and it is anticipated that they will be able to fulfill the majority of contracts booked earlier in the season on "if and when made" basis. Current ceiling price makes the use of this commodity prohibitive in fertilizer mixtures.

FERTILIZER MATERIALS

LET US QUOTE YOU ON YOUR REQUIREMENTS OF THESE MATERIALS

PHOSPHATE ROCK

SUPERPHOSPHATE

DOUBLE SUPERPHOSPHATE

NITRATE *of* SODA

SULPHURIC ACID

SULPHATE *of* AMMONIA

BONE MEALS

POTASH SALTS

DRIED BLOOD

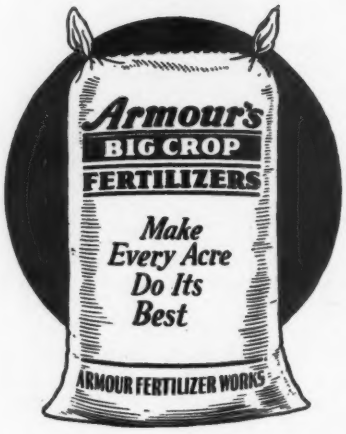
TANKAGES

COTTONSEED MEAL

BONE BLACK

PIGMENT BLACK

SODIUM FLUOSILICATE



ARMOUR FERTILIZER WORKS

General Offices: Walton Building, Atlanta, Ga.

Division Sales Offices:

Albany, Ga.
Atlanta, Ga.
Augusta, Ga.
Baltimore, Md.
Birmingham, Ala.
Chicago Heights, Ill.
Cincinnati, Ohio
Columbia, S. C.
Columbus, Ga.
East St. Louis, Ill.
Greensboro, N. C.
Havana, Cuba
Houston, Texas
Jacksonville, Fla.
Montgomery, Ala.
Nashville, Tenn.
New Orleans, La.
New York, N. Y.
Norfolk, Va.
Presque Isle, Me.
San Juan, P. R.
Sandusky, Ohio
Wilmington, N. C.

Superphosphate.—There is no change in the situation but producers are sold up and are not in position to take any more business on the basis of the ceiling price of $9.60 per ton of 2,000 lb., basis 16 per cent for run-of-pile, f. o. b. producers' works, Baltimore.

Bone Meal.—Offerings are few and far between and the market is strictly nominal, as each quotation applies only on current offerings. Both raw and steamed bone meal are in short supply.

Potash.—It is reported that all domestic producers are now sold up and are not in position to take on further business for the coming spring season.

Bags.—Some small shipments of burlap have arrived, but fertilizer manufacturers are not in position to take deliveries and hold the bags until next spring, due to requirement of 30-day certificate. After the turn of the year, it is anticipated that shipments covered by Government war risk insurance will be arriving at considerable saving in price, which will doubtless be reflected in the selling price of burlap bags.

CHICAGO

Fertilizer Organics Scarce with Exception of Bone Meal. Feed Market at Ceiling Prices with Good Demand

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, October 5, 1942.

Inquiry for organics continues, but sales are light, owing to lack of offerings. There can be no doubt of sellers sold up position, as buyers make no argument as to prices of such offerings as come into the market. The bone meal situation is quite the reverse; supply is fairly liberal but buyers are apparently not interested.

Ceiling prices prevail in the feed market. Sellers are putting out but few offerings, and, when made, find ready, and possibly anxious, buyers.

Nominal prices remain at the ceiling as follows:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.37 per unit ammonia ($6.53 per unit N); blood, $5.80 to $5.85 ($7.05 to $7.11 per unit N); dry rendered tankage, $1.21 per unit of protein, Chicago basis.

CHARLESTON

Organic Fertilizer Materials Still Scarce With Few Quotations. Blood Prices Beyond Fertilizer Range

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, October 7, 1942.

Soy bean meal for quick shipment is scarce, and so far practically no peanut meal is being offered for prompt shipment.

Nitrogenous.—Producers of this material are still out of the market.

Castor Meal.—Very limited arrivals of castor beans reached this country, but sellers are not making any further quotations yet.

Blood.—None of this material is now to be had for the fertilizer trade, even if they were willing to pay the price. Unground blood has just been quoted as high as $5.90 per unit of ammonia ($7.17 per unit N), f. o. b. Chicago.

Cottonseed Meal.—The prices on the 8 per cent grade are: Atlanta, $5.30; Memphis, $35.50 to $36.00.

TENNESSEE PHOSPHATE

Rains Damage Storage Dams. Rock Shipments Continue at a High Level. Price Increase Hearings Being Held

Exclusive Correspondence to "The American Fertilizer"

COLUMBIA, TENN., October 5, 1942.

Deep fall weather for this section has prevailed for several weeks. The frost has been on the pumpkin several times, but not much fodder in the shock; the enormous crop of all kinds of hay makes fodder-pulling one of the unnecessary farm activities this year.

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor :: Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

500 Fifth Avenue, New York

The disintegrating effect of fall rains, probably combined with crawfish activities, caused heavy damage to the two largest mine operators in the field, by washing out of the dams holding in two of the largest settling ponds, one at Wales, where the resulting flood in Richland Creek covered the city water supply pumps of the town of Pulaski with several feet of mud, and the other at Mt. Pleasant, resulting only in the customary flood of muddy water several miles down Bigby Creek.

Shipments are still going out at a rapid rate, stimulated as to ground rock for direct application by the extension in Illinois by the AAA of the deadline for obtaining benefit payments from the AAA program for application of ground phosphate rock, from October 1st to November 1st. It is hoped that AAA will nationally extend this time limit all over the states where benefit payments are allowed (18 out of the 48) until at least December 15th, as the farmers and the phosphate shippers are not at fault but have simply had so many more orders than could possibly be expected that all shippers are practically fifty per cent behind in filling them.

Hearings have been conducted as to the prices phosphate operators are to be allowed to charge manufacturers for raw material phosphate rock and it is believed that a general rise of about fifty cents per ton on the crude rock will be fixed to care for the increased wage and other costs occurring since any change in rock prices has been made.

The raise of fifty cents by one concern, effective in the price of ground phosphate July 1st, was disallowed by OPA, notwithstanding it had been announced in February before any price ceilings were established.

There is some question as to what the AAA will do in Illinois or in some of the other states of same region for 1943. While the AAA in all other states refused to allow grants-of-aid for farmers to buy rock phosphate, and in only 18 states allow even benefit payments for its use, the Illinois committee started in 1941 making grants of aid in eleven counties and succeeded in giving away about eight thousand tons of low grade coarsely ground material. In 1942 this experiment has grown to nearly 15,000 tons of the same material for the first nine months, and 6,000 more already provided. The demand for 1943 for Illinois alone is reported to run over 60,000 tons, if it can be had.

Buhner Resigns Motor Transport Office

Edward J. Buhner, president of the Silver Fleet, and secretary-treasurer of the Buhner Fertilizer Company, Seymour, Ind., has resigned as Chief of Operations (Property Carriers), Division of Motor Transport, Office of Defense Transportation, to return to his own business in Indiana. He has rendered valuable public service throughout his assistance to the ODT. His wide executive experience in both the trucking industry and the fertilizer industry has been of great help in handling transportation problems and needs. The name of his successor has not yet been announced.

Prussian Company Now Operating Alsatian Potash Mines

A Prussian Federal State-owned company has leased the entire Alsatian potash industry. Because of transportation difficulties the potash from Alsatian mines is now largely used in France, the Low Countries, and western Germany, while that from mines in central Germany is used in eastern areas.

PULVERIZED
MASCOT
LIMESTONE
Trade Mark Registered

MAGNESIUM LIMESTONE
"It's a Dolomite"
American Limestone Company
Knoxville, Tenn.

America's other Shock Troops

THE Nation's welfare—the health of civilians and soldiers alike—depends to a large extent on these "Armies" in the field. In fact America's many kinds of crops are helping to feed the entire free World—giving added strength and vigor to our Allies.

In this important work, the fertilizer industry is playing a vital part. And potash—Sunshine State Potash from New Mexico's mines—is helping to do the job.

Easily blended into complete fertilizers, this health-giving nutrient means better crops and higher yields.

Thus, America's farms are more effective fighting units—with the aid of potash!

REG. U. S. PAT. OFF.

SUNSHINE STATE POTASH — A PRODUCT OF NEW MEXICO U.S.A.

UNITED STATES POTASH COMPANY
INCORPORATED
30 ROCKEFELLER PLAZA NEW YORK CITY

•

HIGRADE MURIATE OF POTASH 62/63% K_2O
Also 50% K_2O Grade
MANURE SALTS 22% K_2O Minimum

Davison Chemical Reports Profitable Operation

The annual report of the Davison Chemical Corporation for the fiscal year ended June 30, 1942, shows net income of $1,077,280, after provision for income taxes and reserve for possible reduction in inventory values. Net sales amounted to $14,416,328, an increase of 40 per cent over the previous year. A dividend of 60 cents per share was paid on the common stock during the year.

August Sulphate of Ammonia Production

Production of by-product sulphate of ammonia during August continued at the levels maintained during the past year, namely, about 2,000 tons per day. August shipments increased materially, with the result that stocks on hand at the end of the month were somewhat smaller than usual.

	Sulphate Ammonia Tons	Ammonia Liquor Tons NH_3
Production:		
August, 1942	64,077	2,807
July, 1942	64,288	2,792
August, 1941	64,401	2,662
January-August, 1942	512,255	22,351
January-August, 1941	493,234	20,947
Shipments:		
August, 1942	68,444	2,812
July, 1942	21,330	2,988
August, 1941	63,118	2,812
Stocks on Hand:		
August 31, 1942	58,148	850
July 31, 1942	62,654	711
August 31, 1942	44,072	810
July 31, 1942	45,218	768

CLASSIFIED ADVERTISEMENT

HELP WANTED

WANTED—Experienced superintendent for Southern dry mixing plant. Must furnish A-1 references. Address "585" care THE AMERICAN FERTILIZER, Philadelphia.

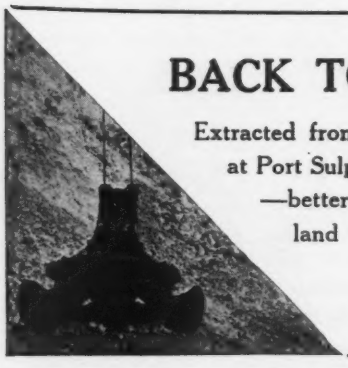
INDUSTRY COMMITTEE MAKES RECOMMENDATIONS FOR FERTILIZER DISTRIBUTION

(Continued from page 9)

supplies and needs. The ultimate results should be a total tonnage of mixed fertilizers approximately equivalent to last year's tonnage, but with lower nitrogen content all along the line. Here again it may be said there will be little doubt of the accomplishment of this objective, provided oil meals in substantial quantities are made available as a nitrogen source in mixed fertilizers.

(b) Alabama is one state which may be an exception to the general rule and because on the approved list of grades there is nothing less than 4 per cent nitrogen goods in that state, the objective of being able to offer the farmers as many tons of nitrogen-carrying fertilizer as was used by them in the preceding year may not be possible. If further investigation and consideration by this Committee indicates this to be true, then a different plan for the equitable distribution of fertilizers within that State may need to be formulated, which the Committee will be glad to undertake if our general recommendations meet with approval. The same might possibly be true of one or two additional States, and in that event a program can be worked out on an individual State basis, so as to accomplish a fair and equitable distribution.

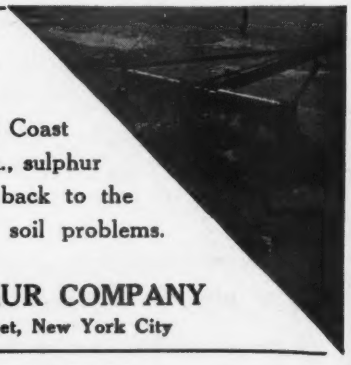
9. As a means of implementing the distribution of fertilizers to farmers on an historical basis and of making available to farmers the potash and superphosphate needed for crop production despite the nitrogen shortage, the committee recommends that statements be obtained from farmers purchasing mixed fertilizers as to the quantities and grades purchased in 1941–42 and as to the quantities and grades desired for 1942–43 and the crops on which they are



BACK TO THE LAND

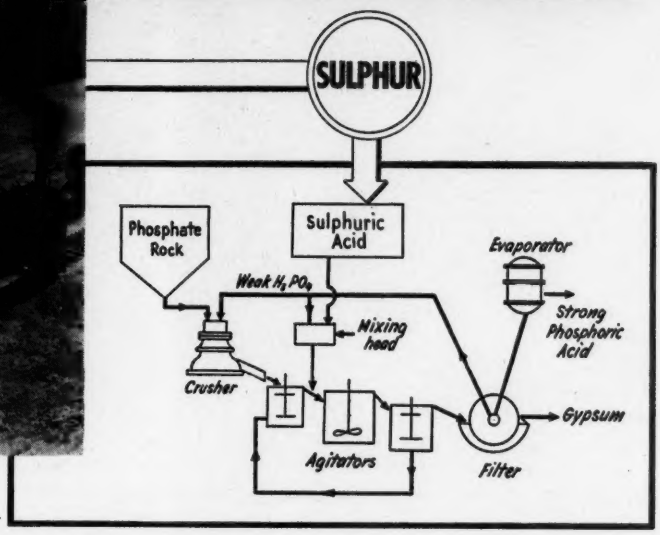
Extracted from deposits beneath the Gulf Coast at Port Sulphur, La., and Freeport, Tex., sulphur —better than 99½% pure—goes back to the land in fertilizer to help solve soil problems.

FREEPORT SULPHUR COMPANY
122 East 42nd Street, New York City



MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

HOW SULPHUR SERVES INDUSTRY



PHOSPHORIC ACID

Phosphate rock is mixed with recycled wash water containing phosphoric acid and is then finely ground. A measured amount of sulphuric acid is added and the slurry is run into a series of agitators. Here the sulphuric acid reacts with the rock to form phosphoric acid and gypsum. The phosphoric acid is concentrated in an evaporator, and the gypsum is discarded or utilized as a by-product.

Sulphuric acid aids in the production of many acids essential to the processing industry. Phosphates are essential in fertilizers. Phosphoric acid supplies the acid constituent in baking powder, soft drinks, jams and jellies. It is used in sugar refining, water softening, photography, yeast culture and dental cements. Our supplies of essential acids are not threatened by any shortages of the important raw material used in the manufacture of sulphuric acid. The Texas Gulf Sulphur Company has in stock more than enough Sulphur to supply all industries for a year or more.

TEXAS GULF SULPHUR CO.
75 E. 45th Street New York City
Mines: Newgulf and Long Point, Texas

10-TG-4

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

expected to be used. For this purpose there are attached form FH–1 for use when proceeding on an historical basis, and Form FH–2 for use where the historical basis will not serve. These forms are self-explanatory. The Committee recommends that these forms be used by persons who make direct contacts with farmers in selling them fertilizers. Manufacturers should furnish adequate supplies of the forms to dealers and agents who sell their products and should use their best efforts to obtain their use in all cases, cooperating fully with government agencies in this respect. The application, when filled in and signed by the farmer, should be retained by the person making the sale.

Chemical Nitrogen Problems for 1943

10. (a) Equitable distribution of straight nitrogen materials, such as Nitrate of Soda and Sulphate of Ammonia, may require a program somewhat different from that outlined herein to cover the distribution of fertilizers, inasmuch as the supply of Nitrate of Soda available in the Spring of 1942 was not ample to meet all the demand, and also inasmuch as there was not an opportunity in the short time available for an equitable plan of distribution to be put into effect, there undoubtedly were some maladjustment and inequities in the history of the spring 1942 season. Therefore, it presents a little different problem, and the extent of the problem is dependent upon the quantity ultimately available for distribution in the 1943 season. Inasmuch as the heaviest consumption of these straight nitrogen materials will occur in the spring of 1943, the Committee feels that best results may be obtained by planning such program nearer the period of heavy consumption when more accurate estimates may be made of the supplies which will be available. The Committee will be glad to undertake the working out of such a program at a time which it is believed will be more appropriate than at present.

(b) Between now and the time when such a program is worked out and put into effect (which should be about the first of January, (1943) it is recommended that these straight nitrogen materials be made available for vegetable crops and orchards, if not in fully ample amounts, then in sufficient quantities to meet minimum requirements as recommended by State agronomists in the various areas. As a means of accomplishing this, it is recommended that form FH–3 be put into use by fertilizer manufacturers, agents, and dealers. On this form a farmer will make application for the said materials. Fertilizer manufacturers shall make said amounts available out of allocations already made to the manufacturer by the War Production Board. If, in any case, the War Production Board has not made allocations to the manufacturer sufficient to take care of said requirements of vegetable growers and orchardists, then the Committee recommends that the War Production Board provide the manufacturer with the materials.

Liaison Officials Recommended

11. To facilitate the operation of the program we recommend that the War Production Board employ persons experienced in the fertilizer business and station them at strategic points throughout the fertilizer-using area. Such persons would serve as liaison men between farmers, County War Boards, and fertilizer manufacturers. This suggestion is particularly important because of the highly seasonal nature of fertilizer distribution. Time is of the essence when farmers are ready to buy and use fertilizers. We recommend that such liaison men be stationed at regional or field officers of the War Production Board, including the following:

Atlanta, Ga.	Columbus, Ohio
Boston, Mass.	Cincinnati, Ohio
Detroit, Mich.	Louisville, Ky.
Birmingham, Ala.	New York, N. Y.
Jackson, Miss.	Baltimore, Md.
Nashville, Tenn.	Columbia, S. C.
Indianapolis, Ind.	Jacksonville, Fla.
Chicago, Ill.	Raleigh, N. C.

12. The Committee recommends that USDA County War Boards be designated to serve as appeal or mediation boards. Such boards would hear any grievances or complaints in connection with fertilizer distribution that might be submitted to them by farmers and use their best efforts to adjust

Stedman FERTILIZER PLANT EQUIPMENT
Founded 1834
Dependable for Fifty Years
All-Steel Self-Contained Fertilizer Mixing Units
Batch Mixers—Dry Batching Pan Mixers—Wet Mixing
Swing Hammer and Cage Type Tailings Pulverizers
Vibrating Screens Dust Weigh Hoppers Acid Weigh Scales
STEDMAN'S FOUNDRY & MACHINE WORKS 505 Indiana Ave. AURORA, INDIANA, U.S.A.

A Complete Service

THE strategic factory locations of the American Agricultural Chemical Company, as shown on the accompanying map, assure prompt, dependable service for the complete line of products listed below.

We manufacture all grades of Commercial Fertilizers, Superphosphate, Agrinite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Glue, Ground Limestone, Crushed Stone, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenate, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Salt Cake; and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish, Blood and Tin-Tetrachloride. We mine and sell all grades of Florida Pebble Phosphate Rock.

FACTORIES

Alexandria, Va.	Detroit, Mich.	Pensacola, Fla.
Baltimore, Md.	East Point, Ga.	Pierce, Fla.
Buffalo, N. Y.	East St. Louis, Ill.	Port Hope, Ont., Can.
Carteret, N. J.	Greensboro, N. C.	Presque Isle, Me.
Cayce, S. C.	Havana, Cuba	Savannah, Ga.
Chambly Canton, Quebec, Can.	Henderson, N. C.	Searsport, Maine
	Montgomery, Ala.	South Amboy, N. J.
Charleston, S. C.	Norfolk, Va.	Spartanburg, S. C.
Cincinnati, Ohio	No. Weymouth, Mass.	West Haven, Conn.
Cleveland, Ohio		Wilmington, N. C.

The AMERICAN AGRICULTURAL CHEMICAL Co.

50 Church Street, New York City

SALES OFFICES

Alexandria, Va.	Columbia, S. C.	Laurel, Miss.	Pierce, Fla.
Baltimore, Md.	Detroit, Mich.	Montgomery, Ala.	Port Hope, Ont., Can.
Buffalo, N. Y.	East St. Louis, Ill.	Montreal, Quebec, Can.	St. Paul, Minnesota
Carteret, N. J.	Greensboro, N. C.	New York, N. Y.	Savannah, Ga.
Charleston, S. C.	Havana, Cuba	Norfolk, Va.	Spartanburg, S. C.
Cincinnati, Ohio	Henderson, N. C.	No. Weymouth, Mass.	Wilmington, N. C.
Cleveland, Ohio	Houlton, Me.	Pensacola, Fla.	

any such matters as between farmers and manufacturers, dealers or agents concerned. In case of inability to work out satisfactory settlement as to any complaint, the Board would report the matter to the most convenient War Production Board liaison man. Occasions might arise in which such a Board would feel that a general conference of the local distributors would be useful in expediting operation of the program.

13. The Committee recommends that information contained in, and recommendations or instructions pursuant to, this report be sent by the War Production Board to individual fertilizer manufacturers, so that they may be fully advised as to functions they will be expected to perform and methods and procedures to be followed in furtherance of the program.

Gasoline For Fertilizer Representatives

14. (a) The equitable distribution of fertilizers and fertilizer materials will require intensive educational work and instruction—this work will not stop with the manufacturer himself, but it must be passed on down to the traveling representatives, agents and dealers. Much personal work and effort is necessary to have the job done properly. In the areas of the United States in which gasoline is now rationed the representatives of fertilizer companies have insufficient allotments to make the necessary contacts and to give the necessary instructions so that a program of the kind recommended can be properly carried out.

(b) The Committee, therefore, recommends and requests that the Office of Price Administration make provision which will result in the representatives of fertilizer companies being able to get sufficient gasoline to carry on this work.

15. For the successful operation of the program announced by the War Production Board and its implementation as recommended in this report, the suggested directional letters to manufacturers, dealers and agents will be most helpful. As already indicated, however, the committee feels that in the additional educational work that will be necessary, personal contacts will be essential. We recommend, therefore, that meetings of small groups of members of the industry should be conducted by the War Production Board to acquaint them with details of the program. Representatives of WPB, USDA, and OPA should be present. We believe that such meetings will result in a better understanding of the whole situation and more intelligent cooperation in making the program effective. For such purpose the members of the Committee will be available if their services are desired by the War Production Board. Following such meetings individual fertilizer manufacturers should hold meetings with their local distributors, agents and dealers, in order to acquaint them with the program.

16. The people engaged in the fertilizer industry, like all other patriotic American citizens, have a genuine desire to contribute their full part to the war effort. The Committee feel that if they are made acquainted with what is expected of them by their government, their full cooperation may be depended upon.

Respectfully submitted,

R. B. DOUGLASS,
M. K. DERRICK,
L. D. HAND,
W. S. RUPP,
J. E. SANFORD,
Committee.

Post-War Nitrogen Problems Discussed

A preliminary conference on post-war nitrogen utilization problems, held in Washington on September 23rd, was attended by representatives of the Association of Land-Grant Colleges and Universities, the American Society of Agronomy, the American Society for Horticultural Sciences, the TVA, the U. S. Department of Agriculture, and the National Fertilizer Association. A wide range of problems was discussed and it was voted to form a national joint committee to continue further investigation. A committee was appointed to arrange for an organization meeting to be held in St. Louis on November 10th, just prior to the annual meeting of the Society of Agronomy.

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See Page 4

CHEMICAL PROPERTIES OF VARIOUS COMMERCIAL SUPERPHOSPHATES BEFORE AND AFTER AMMONIATION

(Continued from page 6)

8 per cent P_2O_5, which is one of the most common types.

(2) The differences in indicated reversion, as measured by the use of 0.5 g., instead of 1 g., sample may furnish some leads relative to the characteristics of the reverted P_2O_5, *e g.*, the solubility of fluorapatite shows little response to change in weight ratio of sample to ammonium citrate solution, while the solubilities of tricalcium phosphate and hydroxytricalcium phosphate are changed appreciably (*4*).

(3) The use of 0.5 g., instead of 1 g., sample has been proposed (*5*) to the A.O.A.C. and culture studies have been undertaken by the Bureau of Plant Industry to determine which method gives values more in line with those indicated by the growing plant.

Reversion was generally appreciably lower as determined by the 0.5 g., instead of the 1 g., method. The average reverted P_2O_5 in all the ammoniated superphosphates after 37 days' storage at 50° C. was indicated to be 2.8 per cent of the total P_2O_5 by the 0. 5 g. method versus 6.7 per cent by the 1 g. A.O.A. C. procedure. The extent of reduction of reverted P_2O_5 indicated through use of 0.5 g. method differed markedly with the various superphosphates as shown in Table III. For example, after 124 days' storage of ammoniated products at 40° C. the indicated reversion in Superphosphate 4 was reduced to 5.1 per cent from 9.9 per cent of the total P_2O_5, while that of Superphosphate 5 was lowered to practically nothing from 8.8 per cent. The differences in behavior of these products may be due in part to differences in their compositions.

The Effect of Fluorine: The fluorine content may be one of the factors causing differences in P_2O_5 solubility between these ammoniated superphosphates. During about the first month's storage at room temperature (about 25° C.) some correlation might be indicated between the P_2O_5 solubility and the fluorine content if we eliminated Superphosphates 4 and 7. However, as shown in Table III, which lists the superphosphates in order of ascending contents of fluorine, no correlation is apparent when the products are subjected to longer storage and higher temperatures. Under severe storage conditions (80° C.) the three phosphates having the highest fluorine contents showed substantially lower reversion than the average of the group, as determined by both the 0.5 g. and 1 g. methods. Thus, these results do not support the belief held by some that the fluorine content of superphosphates is the principal factor in determining the extent of progressive reversion of ammoniated superphosphates during storage.

TABLE IV—PER CENT OF TOTAL P_2O_5 REVERTED VERSUS IRON CONTENT

Superphosphate No.*	% $FePO_4$	At Room Temperature for 36 Days 1 Gram Method	At 80° C. for 112 Days 1 Gram Method	At 80° C. for 112 Days 0.5 Gram Method
5	0.8	1.1	26.1	8.3
6	0.91	4.5	11.7	5.6
8	1.06	3.1	13.7	5.3
1	1.10	1.1	12.6	5.8
2	1.14	1.5	14.7	7.3
3	1.16	2.1	11.0	7.3
4	1.81	3.3	21.8	11.1
7	2.10	3.5	20.3	9.3

*Arranged in ascending order of $FePO_4$ content.

TABLE V—PER CENT OF TOTAL P_2O_5 REVERTED VERSUS ALUMINUM CONTENT

Superphosphate No.*	% $AlPO_4$	At Room Temperature for 36 Days 1 Gram Method	At 80° C. for 112 Days 1 Gram Method	At 80° C. for 112 Days 0.5 Gram Method
6	1.43	4.5	11.7	5.6
2	1.55	1.5	14.7	7.3
8	1.57	3.1	13.7	5.3
5	1.98	1.1	26.1	8.3
3	1.99	2.1	11.0	7.3
4	2.36	3.3	21.8	11.1
1	2.77	1.1	12.6	5.8
7	4.33	3.5	20.3	9.3

*Arranged in ascending order of $AlPO_4$ content.

TABLE III—PER CENT OF TOTAL P_2O_5 REVERTED VERSUS FLUORINE CONTENT

Superphosphate No.*	% Fluorine	At Room Temperature for 36 Days 1 Gram Method	At 40° C. for 42 Days 1 Gram Method	At 40° C. for 42 Days 0.5 Gram Method	At 40° C. for 124 Days 1 Gram Method	At 40° C. for 124 Days 0.5 Gram Method	At 50° C. for 37 Days 1 Gram Method	At 50° C. for 37 Days 0.5 Gram Method	At 50° C. for 121 Days 1 Gram Method	At 50° C. for 121 Days 0.5 Gram Method	At 80° C. for 27 Days 1 Gram Method	At 80° C. for 112 Days 1 Gram Method	At 80° C. for 112 Days 0.5 Gram Method
1	1.57	1.1	4.1	0.8	6.6	1.0	5.2	1.5	7.6	2.6	7.7	12.6	5.8
7	1.67	3.5	6.9	3.3	9.2	5.1	8.1	5.2	10.1	7.0	12.0	20.3	9.3
2	1.68	1.5	5.4	0.9	9.3	3.1	6.6	2.0	9.6	3.8	9.1	14.7	7.3
5	1.70	1.1	4.2	0.6	8.8	0.4	5.6	0.4	9.6	1.5	16.8	26.1	8.3
4	1.80	3.3	7.5	4.5	9.9	5.1	8.1	4.6	9.9	6.5	12.0	21.8	11.1
3	1.92	2.1	4.9	2.3	5.9	2.4	4.9	2.8	6.5	3.3	7.0	11.0	7.3
8	2.07	3.1	5.9	2.5	8.7	3.4	7.2	3.1	8.6	4.0	9.1	13.7	5.3
6	2.15	4.5	7.4	3.1	8.7	3.2	8.4	3.8	9.8	5.8	8.9	11.7	5.6

* Arranged in ascending order of fluorine content.

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Effect of Fe and Al Content: Table IV, which lists superphosphates in order of increasing contents of $FePO_4$, indicates no definite correlation between the iron content and reversion, either in sample stored at room temperature or at 80° C. Table V, which lists superphosphates in order of increasing aluminum content, indicates no consistent relationship between Al content and P_2O_5 reversion. Listing the superphosphates in the order of increasing contents of total Fe and Al indicated no correlation between these and reversion of ammoniated superphosphates in storage under either high or low temperature conditions.

Summary

The P_2O_5 reversion behavior of ammoniated commercial superphosphates during storage at various temperatures may differ markedly from product to product. Variations in the fluorine, iron, aluminum and moisture contents of these products may be factors contributing to these differences in behavior. However, there are no consistent correlations between the contents of any of these and the content of reverted P_2O_5 after ammoniation and storage at different temperatures.

In general, a significantly lower citrate-insoluble content was indicated by the use of 0.5 g. method than by the 1 g. method of determination. The extent of this reduction varied appreciably with the composition of the ammoniated superphosphate and with the storage conditions.

This study has not produced data which serve to simplify the problem of reversion; rather it raises questions relative to the validity of any explanations which attribute reversion primarily to any one constituent, *e g.*, formation of $3[Ca_3(PO_4)_2].CaF_2$.

Acknowledgment

The authors wish to acknowledge the assistance of A. P. Wood, E. Murray and G. B. Dalrymple in obtaining the data.

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(*3*) A. O. A. C., Methods of Analysis, 5th Edition (1940).

(*4*) Ross, W. H., Jacob, K. D., and Beeson, K. C. & J. Assoc. Official Agr. Chem. **15**, 227 (1932).

(*5*) Jones R. M., and Rohner, L. V., *Ibid.*, **25**, 195 (1942).

Program for Purchase and Distribution of Winter Cover Crop Seed

On September 29th, the U. S. Department of Agriculture announced continuation in 1943 of programs for purchase (largely in the Pacific Northwest) and distribution (in the cotton and tobacco South) of winter cover crop seed at prices to growers identical with those of 1942.

The programs will continue to be handled through joint action of the Commodity Credit Corporation, which will buy the seed from growers, and the Agricultural Adjustment Agency, which will be in charge of distribution directly to farmers.

CCC will purchase top grade seed from growers on the basis of these varieties and minimum prices: Austrian winter peas, 5 c. per pound; hairy vetch, 10 c.; Willamette vetch, 6.5 c.; common vetch, 5 c.; Monantha vetch, 6.5 c.; crimson clover, 10 c.; ryegrass, 5 c.; rough peavine, 10 c.; perennial peavine, 10 c.

The Government purchase assurances will act as a price support for the entire 1943 crop.

A large share of the seed which the Government expects to buy at these prices will be grown in the Willamette Valley in Oregon, although large acreages also are expected in Washington, California, Idaho, Tennessee, Arkansas, Kentucky, Alabama, and Michigan. Seed purchased east of the Rocky Mountain area will be at the above prices, plus an amount equivalent to the freight cost from Oregon points. All purchases will be on the basis of bagged, recleaned, fumigated seed packaged in cotton bags of approved quality, except that the cotton bag requirement will not apply to ryegrass.

The purchase and distribution programs will be much the same as in 1942. After seed has been purchased by CCC, it will be transferred to the AAA and shipped to points in the Southern and East Central States where county AAA committees will offer it to cooperating farmers in lieu of payments under the Agricultural Conservation Program. It wil be available at actual cost plus shipping and handling charges.

Because of the growing demand for cover crop seed in the southeastern States, seed growers increased their acreage by nearly 50 per cent in 1942, harvesting over half a million acres for seed purposes. An additional increase is being asked in 1943, especially in hairy vetch and ryegrass.

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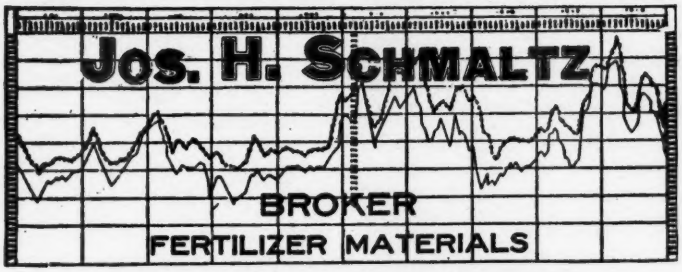

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Chemical Construction Corp., New York City.

ACID EGGS
Chemical Construction Corp., New York City.

ACIDULATING UNITS
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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DUST COLLECTING SYSTEMS
Sackett & Sons Co., The A. J., Baltimore, Md.

ELECTRIC MOTORS AND APPLIANCES
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ELEVATORS AND CONVEYORS—Portable
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ENGINES—Steam
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

EXCAVATORS AND DREDGES—Drag Line and Cableway
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Link Belt Speeder Corp., Chicago, Ill., and Cedar Rapids, Iowa.

FERTILIZER MANUFACTURERS
American Agricultural Chemical Co., New York City.
American Cyanamid Company, New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Company, Columbus, Ohio.
International Minerals and Chemical Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

FOUNDERS AND MACHINISTS
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE
Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

GELATINE AND GLUE
American Agricultural Chemical Co., New York City.

GUANO
Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable
Hayward Company, The, New York City.

HOPPERS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

IRON SULPHATE
Tennessee Corporation, Atlanta, Ga.

INSECTICIDES
American Agricultural Chemical Co., New York City.

LACING—Belt
Sackett & Sons Co., The A. J., Baltimore, Md.

LIMESTONE
American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Duriron Co., Inc., The, Dayton, Ohio.
Fairlie, Andrew M., Atlanta, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Coal and Ash Handling
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Elevating and Conveying
Atlanta Utility Works, East Point, Ga.
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

MACHINERY—Power Transmission
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Pumping
Atlanta Utility Works, East Point, Ga.
Duriron Co., Inc., The, Dayton, Ohio.

MACHINERY—Tankage and Fish Scrap
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MAGNETS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MANGANESE SULPHATE
McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

NITRATE OF SODA
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
Chilean Nitrate Sales Corp., New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS
Chemical Construction Corp., New York City.

NITROGEN SOLUTIONS
Barrett Division, The, Allied Chemical & Dye Corp., New York City.

NITROGENOUS ORGANIC MATERIAL
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., Wilmington, Del.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.

PACKING—For Acid Towers
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

PANS AND POTS
Stedman's Foundry and Mach. Works, Aurora, Ind.

PHOSPHATE MINING PLANTS
Chemical Construction Corp., New York City.

PHOSPHATE ROCK
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
Ruhm, H. D., Mount Pleasant, Tenn.
Schmaltz, Jos. H., Chicago, Ill.
Southern Phosphate Corp., Baltimore, Md.
Virginia–Carolina Chemical Corp. (Mining Dept.), Richmond, Va.
Wellmann, William E., Baltimore, Md.

PIPE—Acid Resisting
Duriron Co., Inc., The, Dayton, Ohio.

PIPES—Chemical Stoneware
Chemical Construction Corp., New York City.

PIPES—Wooden
Stedman's Foundry and Mach. Works, Aurora, Ind.

PLANT CONSTRUCTION—Fertilizer and Acid
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

POTASH SALTS—Manufacturers
American Potash and Chem. Corp., New York City.
Potash Co. of America, New York City.
International Minerals & Chemical Corp., Chicago, Ill.
United States Potash Co., New York City.

PULLEYS AND HANGERS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

PUMPS—Acid-Resisting
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

PYRITES—Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., New York City.
Wellmann, William E., Baltimore, Md.

QUARTZ
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

RINGS—Sulphuric Acid Tower
Chemical Construction Corp., New York City.

ROUGH AMMONIATES
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

SCALES—Including Automatic Bagging
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SCRAPERS—Drag
Hayward Company, The, New York City.

SCREENS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SEPARATORS—Air
Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Including Vibrating
Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Magnetic
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHAFTING
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHOVELS—Power
Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corporation, Chicago, Ill., and Cedar Rapids, Iowa.
Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS—Acid Chambers
Monarch Mfg. Works, Inc., Philadelphia, Pa.

SPROCKET WHEELS (See Chains and Sprockets)

STACKS
Sackett & Sons Co., The A. J., Baltimore, Md.

SULPHATE OF AMMONIA
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Hydrocarbon Products Co., New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

SULPHUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Freeport Sulphur Co., New York City.
Texas Gulf Sulphur Co., New York City.

SULPHURIC ACID
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.

SULPHURIC ACID—Continued
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SYPHONS—For Acid
Monarch Mfg. Works, Inc., Philadelphia, Pa.

TALLOW AND GREASE
American Agricultural Chemical Co., New York City.

TANKAGE
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Smith-Rowland, Norfolk, Va.
Wellmann, William E., Baltimore, Md.

TANKAGE—Garbage
Huber & Company, New York City.

TANKS
Sackett & Sons, Co., The A. J., Baltimore, Md.

TILE—Acid-Proof
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

TOWERS—Acid and Absorption
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

UNLOADERS—Car and Boat
Hayward Company, The, New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

UREA
DuPont de Nemours & Co., E. I., Wilmington, Del.

UREA-AMMONIA LIQUOR
DuPont de Nemours & Co., E. I., Wilmington, Del.

VALVES—Acid-Resisting
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

WHEELBARROW (See Carts)

ZINC SULPHATE
Tennessee Corporation, Atlanta, Ga.

ALPHABETICAL LIST OF ADVERTISERS

For Classified Index, see pages 28 to 32, inclusive

American Agricultural Chemical Co., New York City....21
American Cyanamid Co., New York City.. 3
American Limestone Co., Knoxville, Tenn..16
American Potash and Chemical Corp., New York City....4, 23
Armour Fertilizer Works, Atlanta, Ga.....14
Ashcraft-Wilkinson Co., Atlanta, Ga. Front cover
Atlanta Utility Works, East Point, Ga....—

Bagpak, Inc., New York City.....—
Baker & Bro., H. J., New York City, Back cover
Barrett Division, Allied Chemical & Dye Corporation, New York City.....—
Bemis Bro. Bag Co, St. Louis, Mo.....—
Bradley & Baker, New York City.....12

Charlotte Chemical Lab., Charlotte, N. C..23
Chemical Construction Corp., New York City.....25
Chilean Nitrate Educational Bureau, New York City.....34

Dickerson Co., The, Philadelphia, Pa.....—
Dougherty, Jr., E., Philadelphia, Pa.....33
Du Pont de Nemours & Co., E. I., Wilmington, Del.....—
Duriron Company, Dayton, Ohio.....—

Fairlie, Andrew M., Atlanta, Ga.....29
Farmers Fertilizer Co., Columbus, Ohio...34
Freeport Sulphur Co., New York City....18

Gascoyne & Co., Inc., Baltimore, Md.....34

Hayward Company, The, New York City..34
Huber Co, L. W., New York City and Jersey City, N. J.....22
Hydrocarbon Products Co., New York City.15

International Minerals & Chemical Corporation, Chicago, Ill.....2d cover

Jeffrey Manufacturing Co., The, Columbus, Ohio.....—
Jett, Joseph C., Norfolk, Va.....—

Keim, Samuel D., Philadelphia, Pa.....33

Link-Belt Company, Chicago, Ill.....—

McIver & Son, Alex. M., Charleston, S. C..27

Monarch Mfg. Works, Inc., Philadelphia, Pa.....34

Pacific Coast Borax Co., New York City..—
Phosphate Mining Co., The, New York City.....25
Polk Co., R. L., Detroit, Mich.....27
Potash Co. of America, Baltimore, Md. 3d cover
Ruhm, H. D., Columbia, Tenn.....34

Sackett & Sons Co., The A. J., Baltimore, Md.....—
Schmaltz, Jos. H., Chicago, Ill.....27
Shuey & Company, Inc., Savannah, Ga...34
Smith-Rowland Co., Norfolk, Va.....—
Southern Phosphate Corp., New York City.27
Stedman's Foundry and Machine Works, Aurora, Ind.....20
Stillwell & Gladding, New York City.....34
St. Regis Paper Co., New York City.....—
Synthetic Nitrogen Products Co., New York City.....—

Tennessee Corporation, Atlanta, Ga.....—
Texas Gulf Sulphur Co., New York City..19

U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.....23
United States Potash Co., New York City.17

Virginia-Carolina Chemical Corp., Mining Dept., Richmond, Va..... 4

Wellmann, William E., Baltimore, Md....25
Wiley & Company, Inc., Baltimore, Md...34

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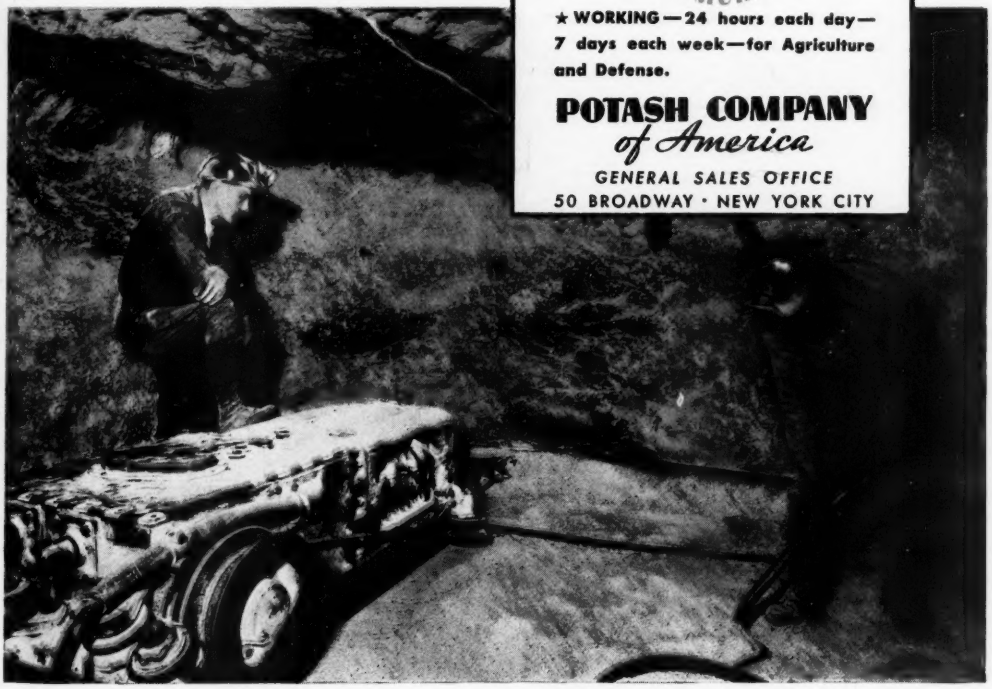

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